

BOOK 6



# LIVING RESOURCES

*I am a savage and do not understand any other way. I have seen a thousand rotting buffaloes on the prairie, left by the white man who shot them from a passing train. I am a savage and do not understand how the smoking iron horse can be more important than the buffalo that we kill only to stay alive. What is man without the beasts? If all the beasts were gone, men would die from a great loneliness of spirit. For whatever happens to the beasts, soon happens to man. All things are connected.*

— Chief Seattle

## Living Resources

What did you eat for lunch today? Rice and dal? Chapatis and vegetables? Sandwiches and fruit? Where do all these food stuffs come from? Grain, pulses, fruit, vegetables and spices are bought from shops in the market, of course. But where do the traders get their merchandise from? Large wholesale traders? They in turn buy produce from the growers. So, perhaps, we could say that eventually our food comes from the farmers who grow the crops.

But where did we get our crops from? All our agricultural plants are *domesticated* varieties of wild plants. Two thousand years ago, human beings had already domesticated most of the useful plants and animals. Since then human ingenuity has improved these crops so that they produce bigger and better yields. Domestication makes it more convenient for people to produce the food they need.

Before human beings had discovered how to raise crops, they lived entirely by hunting wild animals and gathering wild plants. These provided them with food, and also with fibre and medicine. Even today many tribal and other forest-dwellers depend to a great extent on the resources of the wild to fulfil everyday needs for food, fuel, clothing and shelter.

Although agriculture now supplies us with most of our food, we still depend directly on wildlife in many ways. Can you think how? Marine fishing is one good example. From ancient

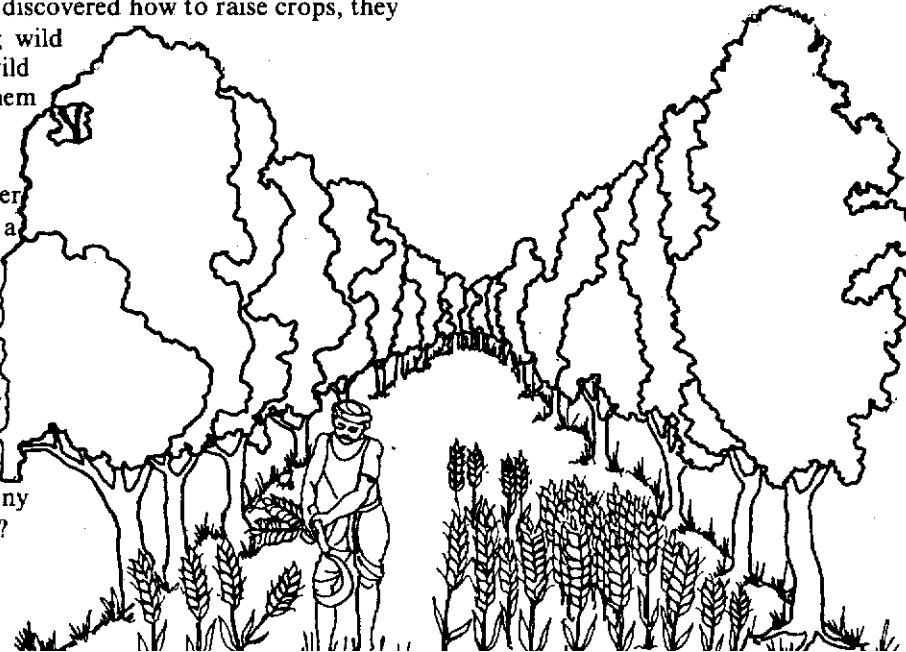
times people have been setting out to sea to catch fish. Through the ages the technology used has become more and more sophisticated so that more fish can be caught, more easily and at greater distances from the land.

Throughout history, human beings have used only about 5,000 plant species for food and fibre. At present only about 150 species are used extensively, and only three species — wheat, rice and maize, provide half the total energy requirements of human beings.

Each of the world's basic food crops originated in a relatively confined geographic region. The Indian region is one of 12 such centres of origin in the world.

### Biological Diversity

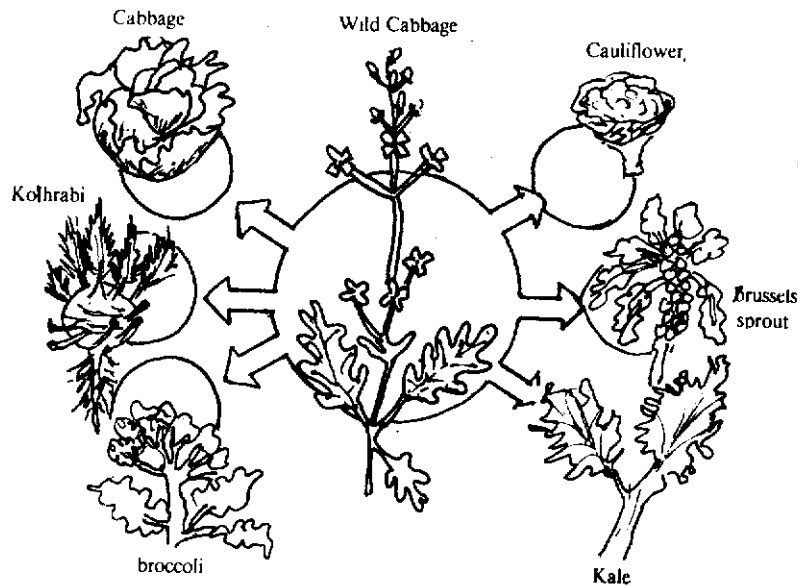
India has an immense wealth of wildlife and habitats. This is the result of its varied soil, climate and vegetation, and millions of years of evolution. We have some 65,000 known species of animals and 45,000 known species of plants, many



of which are the ancestors of our cultivated and medicinal plants. It has been estimated that if we include the animals, plants and microbes that have yet to be identified, we may have as many as 200,000 species. We do not know what potential value these may have for the future in agriculture, forestry, pharmacology (medicines) and industry.

### Genetic Resources

*Biological diversity consists of diversity of ecosystems, populations, species, and genetic resources. We know about ecosystems, populations and species (from Unit 3 Ecology). Genetic diversity is a measure of the variety of genes in a population, whereas species diversity is a measure of the variety of species in a habitat. Genetic diversity is among the most valuable resources for the future. Environmentalists are concerned with the conservation of all kinds of biological diversity including genetic resources.*



Agriculture depends heavily on wild genetic resources. Among the many crop plants that originated from wild varieties in India are rice, sugarcane, many legumes, mango, orange, brinjal, black pepper, oriental cotton and jute. On the other hand, crops like maize, potato, chilli, coffee and New World cottons evolved from wild varieties in other parts of the world and were introduced to India. Wild varieties are hardy and have a greater resistance to disease. Cultivated varieties produce better yields. By crossing (inter-breeding) cultivated and wild varieties we can get an improved crop with the useful characteristics of both. For instance, all the sugarcane grown as a commercial crop in India is derived from crosses between the cultivated variety and wild sugarcane from Java in Indonesia and from South India. Without the disease-resistance quality of the Javan sugarcane, India would not have been able to grow healthy sugarcane at all.

Similarly, the variety of rice most widely grown in the world and called IR 36 acquired its resistance to pests and diseases from wild rice and in particular from one Indian wild variety called *Oryza nivara*. India, Nepal, Bangladesh, China and the countries of South East Asia grow this improved crossbred rice.



ACONITUM  
A WILD MEDICINAL PLANT - THREATENED

Wild plants are also used for preparing many medicines, not only in the Indian medical system of Ayurveda and Unani, but also in modern allopathic medicine. Quinine is a well known example. It is the medicine to treat malaria and is derived from the cinchona plant.

There are two ways in which wildlife contributes to the economy of a community and of a nation: a) by direct use as food, fodder, fuel, fibre etc. and b) as a commodity for trade. Orchids, ivory tusks, frogs legs and a host of other plants and animals (or their parts) are bought and sold as part of legal or illegal trade.

### **The Threat to Wild Life**

Biological resources such as forests, trees, fish and other plants and animals are living resources. These living resources, unlike minerals and fossil fuels, are renewable. Within certain limits, living species can regain their numbers if they become depleted. But if the depletion is too much and occurs too quickly, the natural capacity for renewal is threatened. Our living biological resources may be compared to the foundation of the house of nature. Without these resources the process of the evolution of life, the continuity of nature itself is endangered.

Do you think of the ostrich as an Indian bird? Well, pre historic drawings in caves in Central India do depict the ostrich. In those distant times, the ostrich must have been a common Indian bird. During this century, the cheetah has become extinct. Today, many plants, insects, birds and other animals of all kinds are seriously threatened.

There are many different kinds of threats to wildlife. Over exploitation through excessive hunting or fishing, for trade in skins and furs, or for use as medicines and ornaments, is a direct threat to many species. Wildlife may also be threatened by sudden changes or destruction of their habitat. Habitats may change by the introduction of other species, which may grow abundantly and take-over the area, the growth of weeds



for instance. Or they may age by slow poisoning of the soil by pollutants like pesticides. Deforestation, over-grazing and the draining of wetlands gradually change habitats, sometimes resulting in the habitat being destroyed altogether. More sudden change occurs when wild areas are cleared for agriculture, for human settlements or by development activities such as road building or the construction of dams and reservoirs.

### **Conservation**

How do we counter the threat to our wildlife? How do we preserve our biological diversity for the future? Conservation does not only mean saving some species of plants and animals in a botanical garden or a zoological park, although these have a limited use. Because we are concerned that the natural process of evolution should continue, we have to conserve plants and animals in their natural habitats (in situ) so we have to conserve the habitats. We have to consider not only the range of different species, but the density of the population of each species and the variety within a species.

India has a long history of conservation. Many communities of forest dwellers and fisher people follow traditional practices of maintaining closed seasons, when no hunting or fishing is allowed, so that the natural wildlife population can recoup its numbers. Traditionally, hunting spoils were also shared within a community. Many species have been conserved through the centuries because of religion and social custom. These include trees such as the banyan and peepal, herbs such as the tulsi, animals like the king cobra and the langur monkey. Entire biological communities have also been conserved in sacred groves.

In feudal times, kings and rulers maintained private hunting preserves. They protected certain forests and waterbodies so that they could hunt for tiger, sambhar, partridge, quail, ducks and other species. The forests of Gir (Gujarat),

Ranthambore (Rajasthan) and Bandipur (Karnataka) and the water body created by the rulers of Bharatpur had their origin in hunting preserves. But the purpose was entertainment not conservation, and anything that interfered with this end was removed. So old trees with the nesting holes of woodpeckers and hornbills, for instance, used to be cut down.

The British realised the value of timber from the forests. Some forests were reserved for commercial use, so that the timber could be sent overseas to build ships and to be used in ammunition factories. Some forests were protected for the sake of soil conservation and maintaining the climate. But both in feudal and in colonial times, the local people were kept out of the wild areas, and they could not understand why the areas that they had taken care of for centuries should be set apart to benefit others.



In recent times, national parks, sanctuaries and tiger reserves have been established on the principle that the conservation of large mammals and species at the top of a food web such as the elephant, rhinoceros, tiger and crocodile, will help to maintain the entire web of living beings in the habitat. You will perhaps be surprised to know that India has a larger percentage of such protected areas than the United States (excluding Alaska and Hawaii).

These protected areas have been successful in increasing the numbers of certain species, notably the tiger which has been saved from a position of near extinction. But smaller animals and plants have been virtually overlooked. The other problem is that these protected areas have become tourist resorts, for the enjoyment of affluent urban people. But the local people, who were once the guardians of the forests and whose daily lives depend on forest resources, have been kept out.

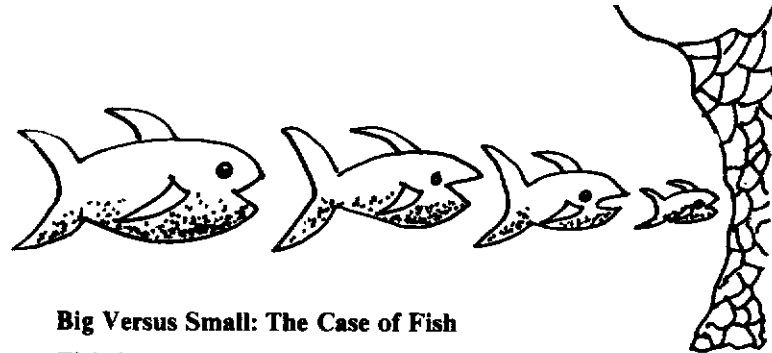
The newest approach to the problem of conservation of wild areas attempts to get over both problems — *Biosphere Reserves* are intended to conserve representative ecosystems of a sufficiently-large size to maintain genetic diversity, while at the same time relating conservation to the needs of the local people, by developing ways in which wild resources can be used without being over-exploited. Sustainable utilisation of resources is now seen as one of the most important aspects of conservation.

Conservation is much more than the protection of a particular species of wildlife.

In 1961, the year that Tanzania became independent, President Julius Nyerere pledged to conserve wildlife. In a document called the Arusha Manifesto, he said: "The survival of our wildlife is a matter of grave concern to all of us in Africa. These wild creatures amid the wild places they inhabit are not only important as a source of wonder and inspiration, but are an integral part of our natural resources and of our future livelihood and well-being. In accepting the trusteeship of our wildlife, we solemnly declare that we will do everything

in our power to make sure that our children's grandchildren will be able to enjoy this rich and precious inheritance."





### Big Versus Small: The Case of Fish

Fish is the poor person's protein. All along our enormous coastline sea-fishing provides millions of people with food and a livelihood. But, today, many big companies with large trawler fleets have entered the fish trade. They have been encouraged by the Government to increase the export of shrimp and prawns, so as to earn foreign exchange.

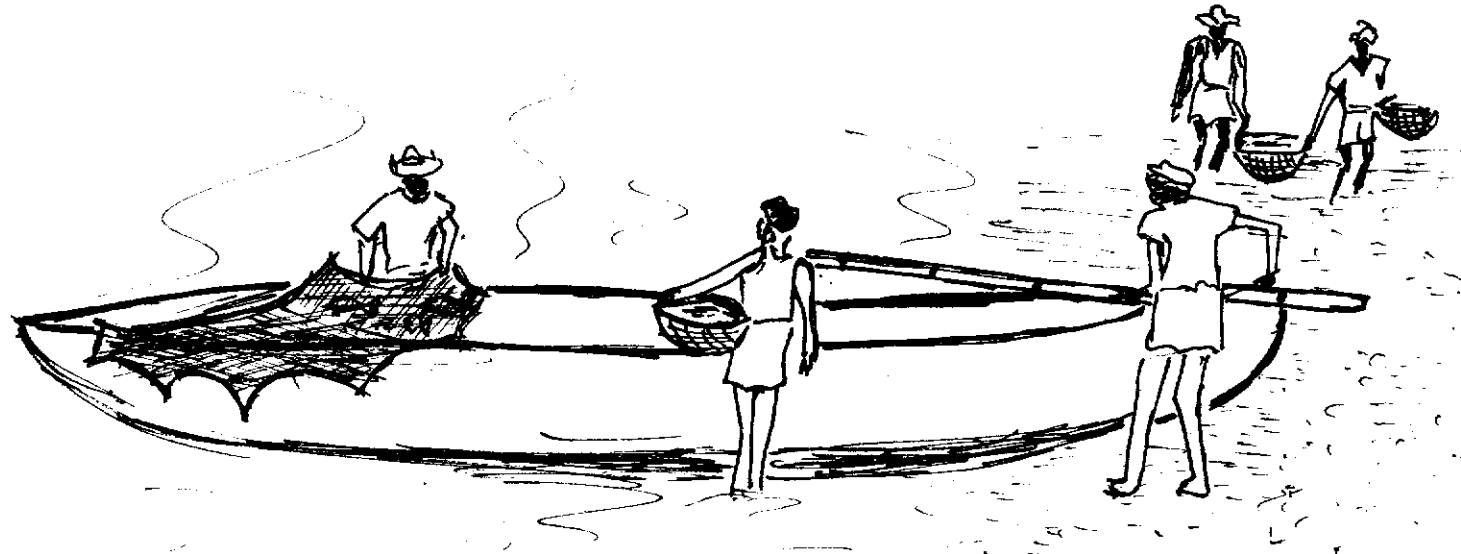
The trawlers systematically overfish areas to increase their profits. They also use a technique called bottom trawling, which damages the ocean floor, and eventually leads to smaller catches of fish.

The big trawler companies have devastated the lives of many

of the 6.5 million people who make up our small fishing communities. Many have gone bankrupt as their catches have diminished and their nets have been destroyed by the trawlers. Several fishermen have also lost their lives in fights with the trawling companies

In fact, there is plenty of space on the seas for both the traditional and modern fisheries. Indian law gives the small fishing communities the exclusive right to fish in a 10 km wide strip along the coast. This is called the inshore zone. Trawlers are supposed to fish beyond this zone. But the companies do not follow the law because they can use less expensive boats, and save on fuel, if they fish inshore. Even more important, prawns and shrimps abound in the inshore zone. It has been reported that in some years, the fish sold by one of the companies (owned by the Tatas) in South East Asia contained 80% in shore species, although it had been licensed to fish only in the deep sea area.

Ironically, thousands of tonnes of dead fish are thrown back into the sea, because they are not of export quality, even as poor and hungry fishermen are forced to give up their occupations and try to get jobs on the trawlers.





### **The Rhino's Story: Return from the Dead?**

The story of the Kaziranga rhinos is a conservation success story, which is in danger of being overturned. The armour-plated Indian rhinoceros lives mainly in Assam—in the Kaziranga National Park, and in the Manas Sanctuary which borders the Kingdom of Nepal at the foot of the Himalayas.

When the Assam plains were cleared for tea plantations by the British in the 19th century, the rhinos were hunted almost to extinction. But in 1908 hunting rhinos became illegal. Hardly a dozen animals remained, but they multiplied to over a thousand.

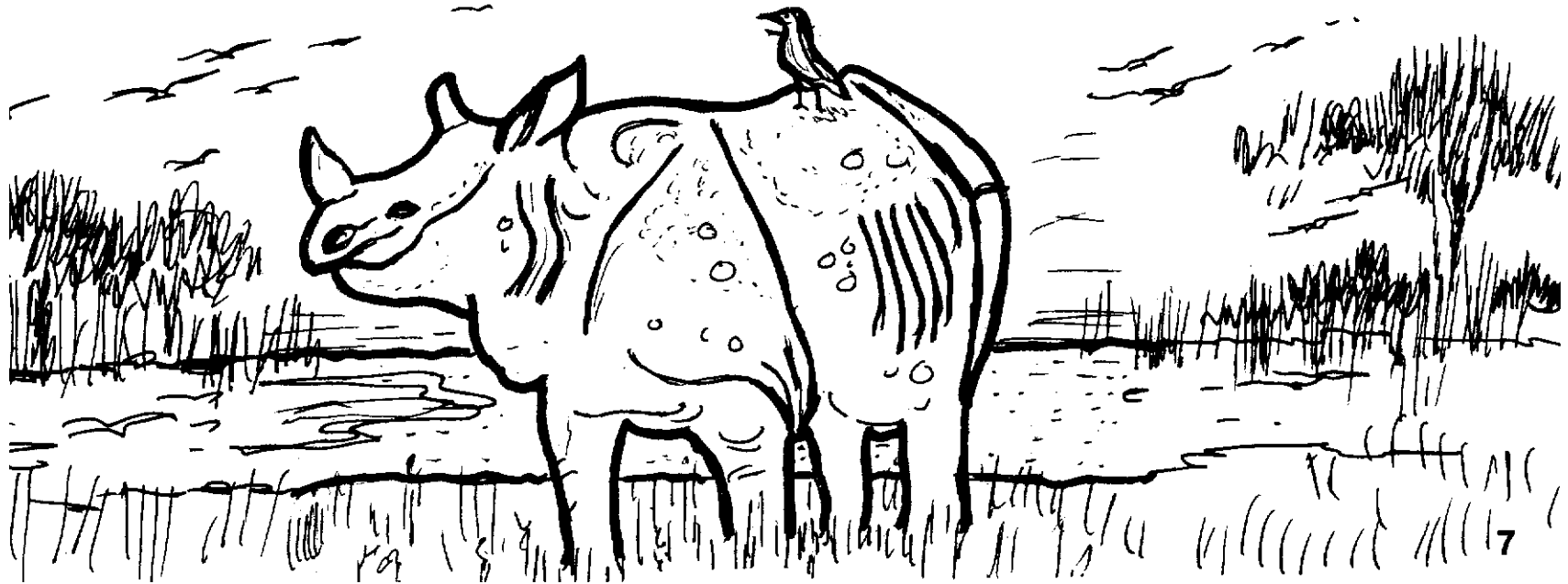
Of the total 1,700 Asian rhinos, 350 are in Nepal's Chitawan National Park. Since 1976 there is only one recorded case of a rhino being poached in Nepal. India's rhinos number 1,100 in Kaziranga and 80 in Manas. Rhino poaching in Kaziranga grew markedly a few years ago, as poachers took advantage of the political unrest in the state.

The poachers have a great incentive. A poaching gang can earn \$4,000 for a kilo of rhino horn, which is valued so highly because some people believe that it has medicinal qualities. The poachers are supported by smuggling organisations who supply them powerful guns, believed to come from Nagaland.

The horn is smuggled to Calcutta, through many middlemen, and then sent on to Singapore. There it fetches an incredible price of \$9,0000 a kilo—fifteen times the price of the less valued African rhino horn.

During the 1980's there has been a vigorous campaign to halt the trade in rhino products. Doctors in Hongkong, Macao, Korea and Taiwan are now beginning to use buffalo horn instead in their medicines. The sale of Indian rhino horn is reported to be declining.

Although there is a Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which bans all trade in rhino products, some countries have not accepted the convention. (India has.)



# Activity

1 & 2

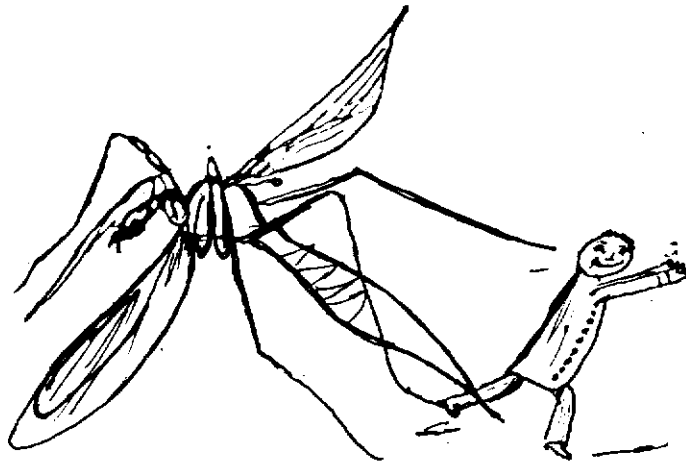
## Disappearing Humans?

...by tomorrow morning we shall almost certainly have one less species on Planet Earth than we had this morning. It will not be a charismatic creature like the tiger. It will be an obscure insect in the depths of some remote rainforest. It may even be a creature that nobody has ever heard of. But it will have gone. A unique form of life will have been driven from the face of the earth for ever.

— Norman Myers  
(in *The Sinking Arc*, Pergamon.)

By the year 2,000, which is not so far off, a million species will have become extinct — the majority through human activities.

Imagine that in the year 2,050 a variety of mosquitoes which have grown as big as motor cars are the dominant species on Earth, and that human beings are the species facing extinction. Describe your feelings in a composition or portray them in a drawing.

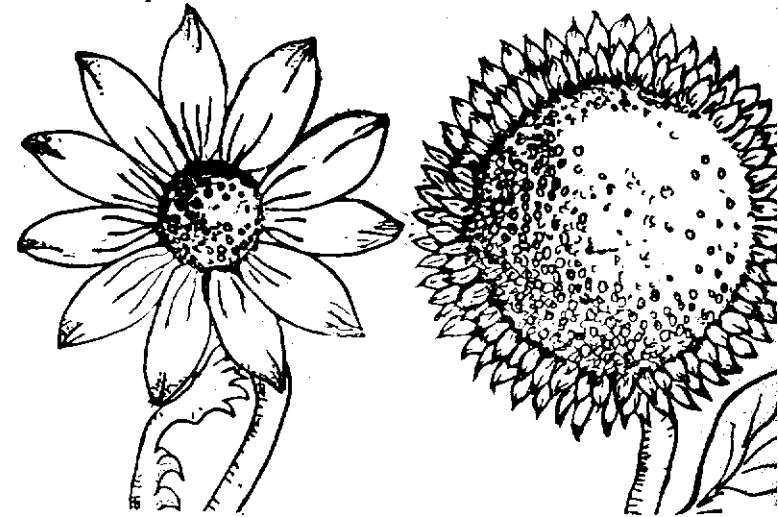


## Oil in the Seed

The hybrid sunflower is a relatively recent crop plant. It is cultivated for its oil-bearing seeds which produce sunflower oil which is used for cooking.

Genes from the wild sunflower (with the big petals) were used to produce the hybrid cultivated variety (with the small petals and the large seed-bearing centre). This helped the sunflower become one of the world's most important oil seed crops.

What cooking medium (vegetable oil or animal fat) does your family use? What do your neighbours use? Name some plants which produce edible vegetable oils. You can find out by noting the different vegetable oils sold in local grocery and ration shops.



Ans. Groundnut, Coconut, Mustard and Sesame oil are among the traditionally used vegetable oils in India; recently, Palm oil (akin to coconut) and Rape seed (akin to mustard) have been introduced. Sunflower and Cornflower oils are among the best for health. Tribals in Central India use oil from the seeds of the Mahua tree.

# Activity

3

## Insect Watch

Is looking the same as observing? When we look at the world around us, how much do we really see? Read Unit 2 on the importance of using our eyes properly. We can learn a great deal, about the wildlife around us, if we train ourselves to observe carefully and learn to record our observations. Start with insects which are the most numerous creatures on earth.

Butterflies, moths, flies, bees, beetles and ants are all insects. Learn to tell them apart.

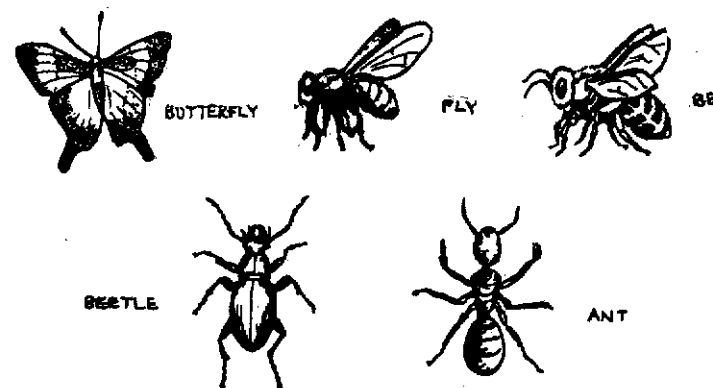
A butterfly's antennae are always clubbed at the ends. Those of a moth may be many shapes, thread-like, feather-like etc.

A fly has only one pair of wings. Instead of the second pair there are two little knobbed stalks, or balancers.

Some flies look like bees. But the bee has two pairs of wings. Flies have one pair.

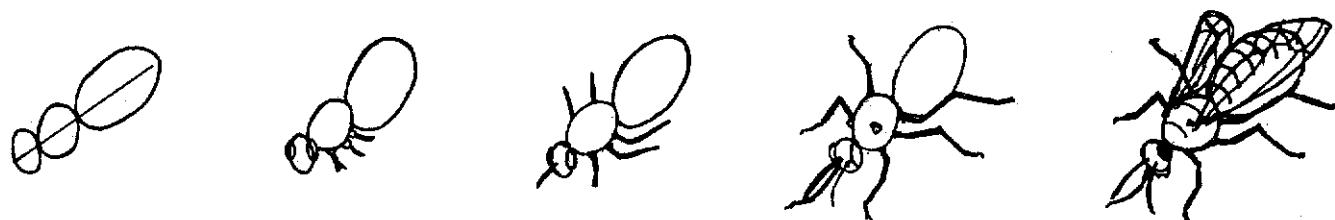
Beetles have hard forewings. They form wing cases protecting the filmy hindwings. The forewings are raised when a beetle flies.

Ants have a pinched waist just between the abdomen and thorax, a large head, powery jaws and antenna.



**Draw an insect.** It's easy when you know how. All insects have three segments or parts: head, thorax and abdomen. And they have legs, eyes and antennae (feelers). Start with the basic shape.

Read: *The Life of Insects* by Maurice Burton, Macdonald Educational, London. *The Story of the Ant* by John Paull, Ladybird Books. U.K.



1. Draw 3 ovals along a centre line. 2. Add circles for eyes and start the legs. 3. Add the second section of the legs, longer than the first. 4. Complete the legs by adding 3rd and 4th sections and hooks on feet. Mark positions of wings and antennae. 5. Draw wings. Now complete the drawing with colour or ink.

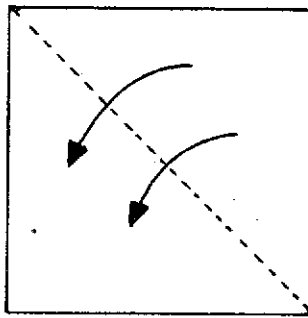
# Activity

## Silence in the Valley

Silent Valley is a tropical evergreen forest in the Western Ghats in Kerala. Its name is well known all over the world because conservationists in Kerala and the rest of India

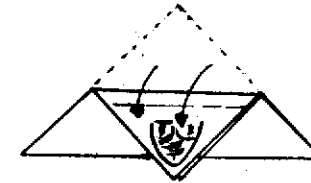
succeeded in preventing a dam from being built along the river in the valley. After much debate, the Government accepted their argument that the electricity generated from such a dam was not worth the submersion of a unique forest ecosystem, home of the lion-tailed macaque and other rare species of

STEP 1



FIRST FOLD THE PAPER FROM CORNER TO CORNER

STEP 2



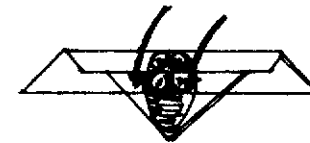
FOLD THE UPPER CORNER TOWARDS YOU.

STEP 3



FOLD THE FLAP UPWARDS ALONG THE LINE INDICATED IN STEP 2

STEP 4



FOLD THE TOP PART OF THE PAPER TOWARDS YOU ALONG THE LINE INDICATED IN STEP 3

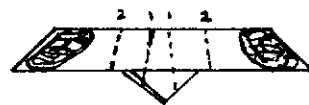
plants and animals.

But why is Silent Valley "Silent"? It is because of the absence of the noisy cicada insect which makes a constant sound by rubbing its wings together. Here's how you can make a cicada with paper. Colour it differently and it becomes a ladybird

beetle!

Origami, the Japanese art of paper folding is an enjoyable craft which can be used to make a variety of bird and animal shapes. These can be used to enliven wall charts, albums, models and other project work.

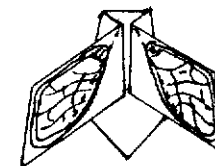
#### STEP 5



TURN THE PAPER OVER AND FOLD ALONG DOTTED LINES 1 AND 2 AS INDICATED

#### STEP 6

BOTTOM VIEW



FOLD THE TWO FLAPS TO MAKE THE WINGS OF THE CICADA

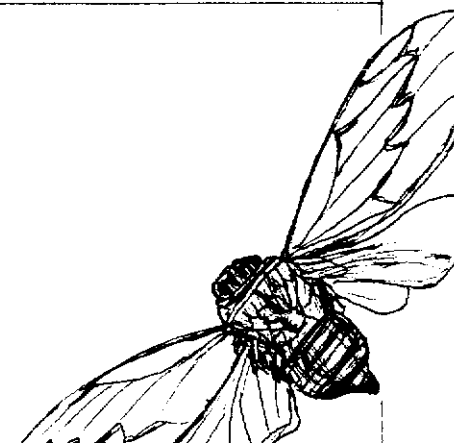
#### STEP 7

TOP VIEW



TURN THE PAPER OVER AGAIN AND FOLD THE

#### STEP 8



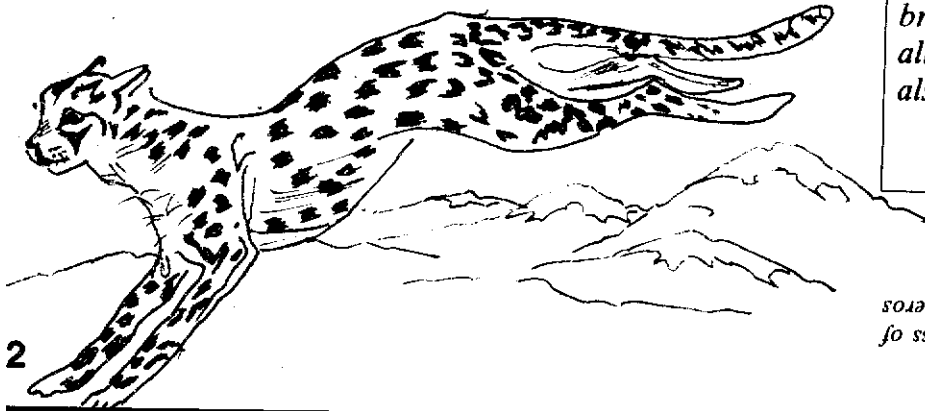
# Activity

5

## What am I?

Answer each one, and then say what is similar about all six.

1. An old man with a beard? No, I am a monkey with a lion's tail, a glossy black coat and great mane of greyish hair down from the temples to the cheeks. I live in the dense tropical forests of the Western Ghats.
2. I am of the family of great cats, and I live in the high Himalayas amidst snow and ice. My coat of soft grey and black spots is quite distinctive.
3. I am a creature of marshland and desert, of the horse family which includes horses, asses and zebras. I have a reddish grey or fawn coloured coat with a dark stripe that runs right along the top of my back.
4. I am a deer, without horns but with sharp canine teeth. My coat of thick bristly hairs is dark brown, speckled with grey. I live on snowy slopes and slippery rocks. The males of my kind are hunted for the strong-smelling gland beneath the skin of our abdomen.



5. I am a huge animal, 170 cm in height and some 335 cm in girth. The great folds of my thick skin are my shield and my single horn makes me look like a creature of bygone days as I wade through the swampy grasslands of North Eastern India.

6. I am a marine mammal along the shores of the Indian Ocean. I have a massive head, an overhanging lip, incisors like tusks, and small beady sunken eyes. I move slowly and have been fished almost to extinction.

Form two teams. Let each team make up a "what am I?" quiz to ask the other team. The clues must indicate a distinctive physical feature and where the animal can be found.

Read: *1000 Animal Quiz*, by Menaka Gandhi, Rupa Co. *Children's Britannica*, *Nature Quiz Book*, Granda, UK. *50 Facts About Animals*, Piper Books, London.

*All that lives beneath earth's fragile canopy is in some elemental fashion related. Is born, moves, feeds, reproduces, dies. Tiger and turtle dove; each tiny flower and homely frog; the running child father to the man, and, in ways as yet unknown, brother to the salamander. If mankind continues to allow whole species to perish, when does their peril also become ours?*

— World Wide Fund for Nature

Answers: 1. lion-tailed macaque 2. Snow leopard 3. Wild Ass of the Rann of Kutch 4. Musk deer 5. one-horned rhinoceros 6. Dugong  
All are rare or endangered mammals

# Activity

6

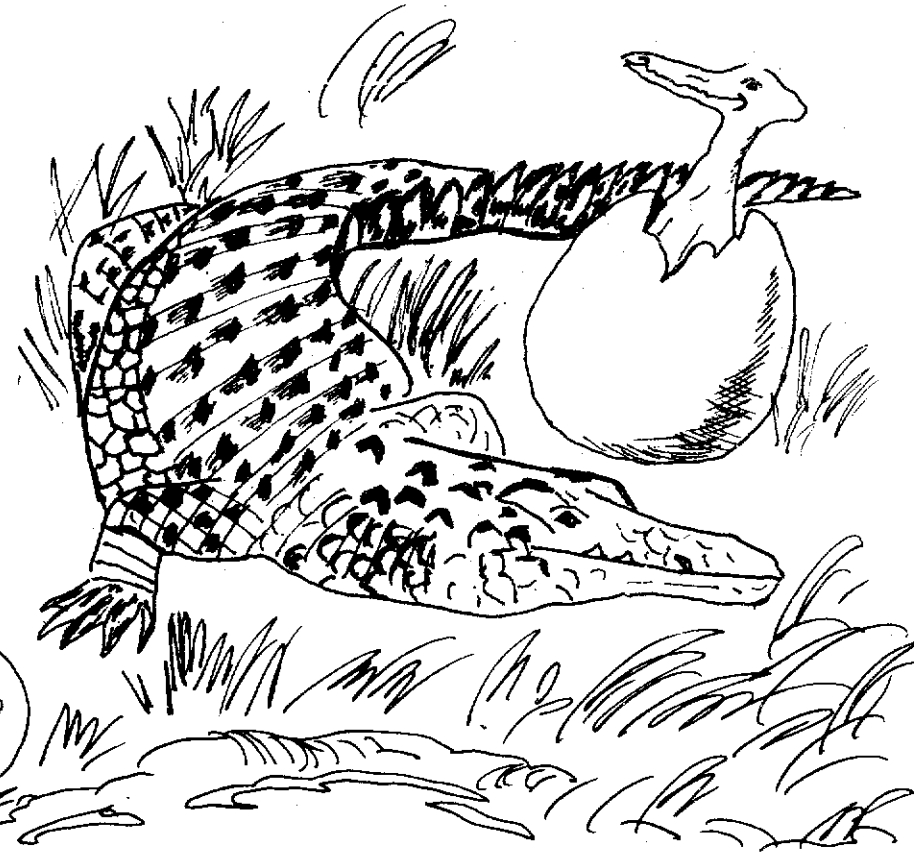
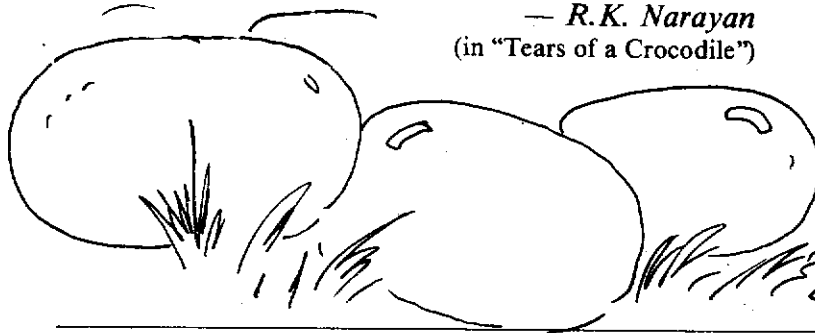
## Crocodile Tears?

I think the crocodile is the most neglected in all God's creation. I have spent considerable amount of thought on this subject. Crocodiles have always fascinated me. I never miss a chance to watch the creature sprawl on its rock beside the dirtiest pond conceivable, looking a geological rather than a zoological specimen. ...

What does a crocodile think? I am sure it has its own values, triumphs, hopes and despairs.

If it could speak, it would probably say: 'I am tired of people's reference to my tears. The worst thing about human beings is that they get into habitual ways of thinking and never outgrow them. Because some fool seems to have imagined us in tears, now no one can think of a crocodile without tears'.....

— R.K. Narayan  
(in "Tears of a Crocodile")



Collect stories about animals from the Panchatantra, Aesop's Fables and Indian mythology and folk songs. Does the depiction show habitual human attitudes to the animal, or is it a true reflection of the nature of the animal?

Visit a zoo if there is one near your school or home. Help

children to distinguish between what each animal is really like, and what it is depicted to be like in stereotypes. Discuss how stereotypes can be misleading.

Read: *Jungle and Backyard*, M. Krishnan, National Book Trust.

# Activity

7

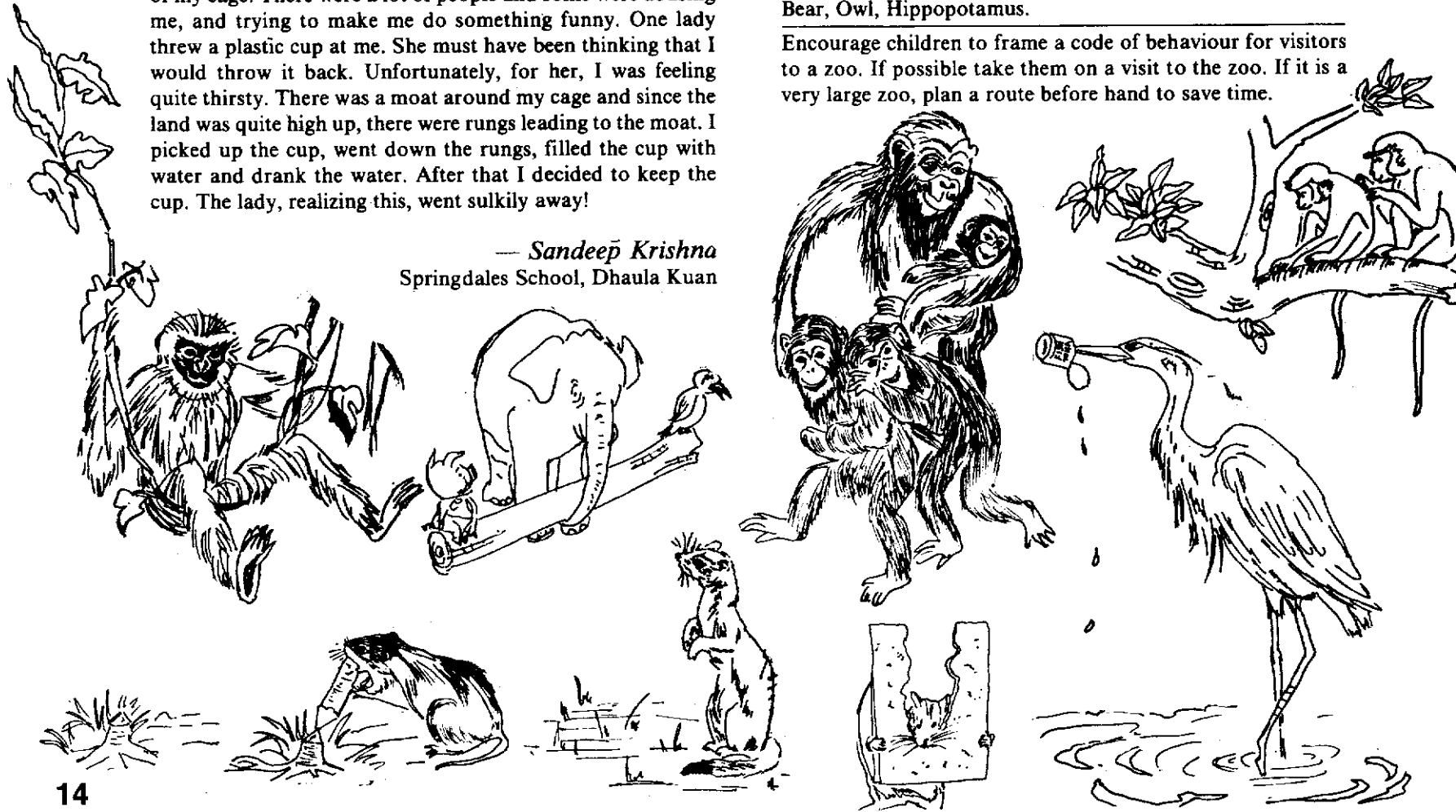
## The Gorilla and the Lady

It was a hot Sunday afternoon and I was lazing in the shadows of my cage. There were a lot of people and some were abusing me, and trying to make me do something funny. One lady threw a plastic cup at me. She must have been thinking that I would throw it back. Unfortunately, for her, I was feeling quite thirsty. There was a moat around my cage and since the land was quite high up, there were rungs leading to the moat. I picked up the cup, went down the rungs, filled the cup with water and drank the water. After that I decided to keep the cup. The lady, realizing this, went sulkily away!

— Sandeep Krishna  
Springdales School, Dhaula Kuan

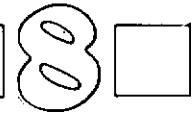
This account was written by a 10-year-old boy who happened to be at the zoo that afternoon. Imagine that you are an animal in a zoo and describe your experience with visitors. You could choose one of these animals, or any other. Snake, Bear, Owl, Hippopotamus.

Encourage children to frame a code of behaviour for visitors to a zoo. If possible take them on a visit to the zoo. If it is a very large zoo, plan a route before hand to save time.





# Activity



## The Poachers

The silence of the night was broken by the sounds of an animal struggling to get out of the trap it had fallen into.

The men who set the trap were hiding in a shelter by the side of a *beel* (pond) nearby. They heard the sounds. Their leader came out and listened to make sure they had caught the right animal. He turned to his companions with a cruel smile. "We have got him," he said, "We have got the rhino."

They were a gang of poachers in the Kaziranga Wild Life Sanctuary in Assam. There were six of them, strong and hefty men. They were familiar with the rhino's habits. It always takes the same route and drops its dung at the same place.

The poachers had watched the movements of a rhino for a few days. When they were sure of the path it took, they dug a deep pit near a dung heap and covered it with strips of bamboo, mud and grass. Then they built a shelter for themselves at a safe distance and waited for the animal to fall into the trap.

The frightened grunts and snorts told them that their waiting was over. They moved swiftly and silently through tall elephant grass in the direction of the sound. The grunts grew louder as they neared the pit.

The leader of the gang spat out commands and the others obeyed him. One of the poachers carried torches made of hollow bamboo tubes stuffed with rags soaked in kerosene. The lighted torches might attract the forest guards. But this was a risk they had to take.

The rhino trapped in the pit looked big in the dim light. It ploughed its head repeatedly into the walls of the pit. The poachers laughed at the futile efforts of the frightened beast.

Each of them knew his job. With strong rope, they made

lassos and passed them over the rhino's snout, neck and legs.

The rhino fought with all its strength. But the men were experts and soon had the ropes all around the animal's body. The ends of the ropes were tightly fastened to iron spikes driven deep into the ground.

The leader of the gang moved into action. He took a *dao* climbed down the pit. The rhino sensed his coming, but he was helpless.

The man landed on its back, he lifted the *dao* and began to hack away at the animal's snout to remove the horn.

The rhino cringed in pain. Blood spouted from its snout like a fountain. The man went on hacking. After a while he stopped and picked up the horn, covered with flesh and blood. He held it up for the others to see. Then he climbed out. His hands were bloody. On his face was a triumphant, fiendish smile.

The poachers' work was over. They put out the torches and left as quietly as they had come.

The rhino stood in the pit, life ebbing out of its body. By morning it would be dead. Vultures would swoop down to feed upon its carcass.

— Arup Das

Write a short skit based on this episode. The "characters" in the skit could include the rhinoceros, two or three poachers, the gang leader, a forest guard, some vultures, and if you like, a narrator.

Children can also choose parts and enact the skit. Be careful that the child playing the rhino is not hurt.

Read: *The Kaziranga Trail*, by Arup Das, Children's Book Trust, New Delhi.

# Activity

9

## Alone on Earth!

The only animals whose disappearance may threaten the biological viability of Man on earth are the bacteria normally inhabiting our bodies. For the rest there is no convincing proof that mankind could not survive even as the only animal species on earth! If economical ways could be developed for synthesising food from inorganic raw materials—which is likely to happen sooner or later—Man may even be able to become independent of plants, on which he now depends as sources of his food ....

I personally—and, I suspect, a vast majority of mankind—would shudder at the idea (of a habitat without animals and plants). But millions of inhabitants of city jungles of New York, Chicago, London or Tokyo have grown up and spent their whole lives in a practically azoic habitat (leaving out rats, mice, cockroaches and other such obnoxious species) and have survived.

— Eugene Rabinowitch



*... plants take nature's raw materials of earth, water, air and sunlight and organise them into living substance. But without the help of animals, plants would long ago have organised themselves out of existence, for they would have locked up in the earth the world's available supply of carbon and then died of starvation. Fortunately, the animals came along in time to eat the plants and thus release the carbon and keep the cycle functioning. The carbon not thus released is still available to us today in the form of coal. Plants therefore build food that makes life possible for animals, and in turn depend on the animals to keep the cycle of life moving.*

— John H. Storer

*The Web of Life*, The New American Library, New York

Consider the point of view put forward here. Write a carefully argued reply to it.

Encourage children to consider other points of view, and to recognise what is reasonable and what is not. See if they can find the flaw in the reasoning in the passage here—Are cities self-sufficient? If a city could make its own food from synthetic materials, could it do without water? Where does a city's water come from? Would this supply be unaffected if there were no plants on earth?

# Activity

9

## Alone on Earth!

The only animals whose disappearance may threaten the biological viability of Man on earth are the bacteria normally inhabiting our bodies. For the rest there is no convincing proof that mankind could not survive even as the only animal species on earth! If economical ways could be developed for synthesising food from inorganic raw materials—which is likely to happen sooner or later—Man may even be able to become independent of plants, on which he now depends as sources of his food ....

I personally—and, I suspect, a vast majority of mankind—would shudder at the idea (of a habitat without animals and plants). But millions of inhabitants of city jungles of New York, Chicago, London or Tokyo have grown up and spent their whole lives in a practically azoic habitat (leaving out rats, mice, cockroaches and other such obnoxious species) and have survived.

— Eugene Rabinowitch



*... plants take nature's raw materials of earth, water, air and sunlight and organise them into living substance. But without the help of animals, plants would long ago have organised themselves out of existence, for they would have locked up in the earth the world's available supply of carbon and then died of starvation. Fortunately, the animals came along in time to eat the plants and thus release the carbon and keep the cycle functioning. The carbon not thus released is still available to us today in the form of coal. Plants therefore build food that makes life possible for animals, and in turn depend on the animals to keep the cycle of life moving.*

— John H. Storer

*The Web of Life*, The New American Library, New York

Consider the point of view put forward here. Write a carefully argued reply to it.

Encourage children to consider other points of view, and to recognise what is reasonable and what is not. See if they can find the flaw in the reasoning in the passage here—Are cities self-sufficient? If a city could make its own food from synthetic materials, could it do without water? Where does a city's water come from? Would this supply be unaffected if there were no plants on earth?

# Activity

10

## Exotic Orchids

The little-known crime of wild orchid smuggling has denuded the eastern Himalaya of its wealth of wild orchids. Several species are threatened and many have already become extinct.

The smugglers make contact with local tribals and bribe them with a few rupees or a bottle of rum to get an armload of rare flowers from remote and inaccessible areas. The tribals, who use orchids as personal decoration, are unaware of their market value. Most of the orchids from the north east end up in Britain, West Germany and the United States, and fetch huge prices. The world wide orchid trade is a multimillion dollar business.

The export of wild orchids from India is illegal; there are no exceptions. But nurseries simply stick wild orchids in pots and label them as nursery-grown. Few customs officials have the botanical training to spot the fraud.

When destruction of the orchid habitat and over-collection from the wild, depleted Sikkim and the adjoining areas, illicit suppliers began looking farther afield, to Arunachal Pradesh, a land of orchids.

Orchid fever hit the West in the middle of the 19th century, about the time when the Asian Lady Slipper orchid, a Himalayan variety, suddenly turned up at an annual flower show in Britain. Known as "the lost orchid" it had been thought to have vanished from the planet and large rewards had been offered for it.

Since then orchids have gained steadily in popularity in the West. Even normal scientific collecting threatens the flowers, and this may have contributed to the disappearance of several species of orchids and other Himalayan plants.

Some years ago the Arunachal Pradesh forestry department established an orchid sanctuary and an orchidarium (a living museum of orchids) and began trying to cultivate orchids. Cultivated orchids could meet the tremendous demand for the flowers, and it could bring employment and good wages to the local people. And, of course, that might mean that the wild orchids could be safe to grow in their natural habitat.

Wild animals and plants are threatened by many different factors. With the help of Unit 6 make wall charts or posters showing the different threats to wildlife.

Read: *Threatened Plants of India*, A State of the Art Report, by S.K. Jain and A.R.K. Sastry, Botanical Survey of India, c/o the Department of Environment Govt. of India, New Delhi.



# Activity

## Similipal, 1985

It has all the ingredients of a sleazy Bombay adventure film: rich tourists, ritual slaughter of exotic animals, military police, jailed tribals, corruption, and a smuggling ring. But the conflict is real, as 5,000 tribal people of the Similipal Tiger Reserve fight to retain their way of life.

They are threatened by five times as many outsiders. Among these are illegal timber merchants, corrupt forest officials, politicians-cum-smugglers who have made their fortunes from illegal forest products, fun-seeking tourists and top government functionaries, all of whom abuse the forest's nature reserve status.

The government's efforts to check the deforestation of Similipal have largely failed. In 1979, a government agency took over the forest trade and attempted to eliminate middlemen. But the middlemen are back as dealers between the tribals and the government agency. Felling in the entire Similipal forest was banned in 1980 but the demand for forest products and the pull of the Calcutta market sustain illegal tree cutting.

The 2,750 square kilometre Similipal reserve, in the eastern state of Orissa, is among the largest of India's 15 tiger reserves. Established in 1973, it was part of "Project Tiger", an effort to save the Indian tiger from extinction and to conserve its forest habitat. Project Tiger is one of the world's best conservation success stories, and has resulted in the number of Indian tigers increasing fourfold to nearly 1,000 in 1984. Deer, elephant and wild buffalo have also benefitted.

Similipal's 65 tigers range over and beyond a core area

recently extended to 800 sq km. Since 1978 there have been plans to evacuate the 25 tribal villages in and around the core. Another 125 villages are located in the surrounding buffer and peripheral zones, bringing the total population to 30,000.

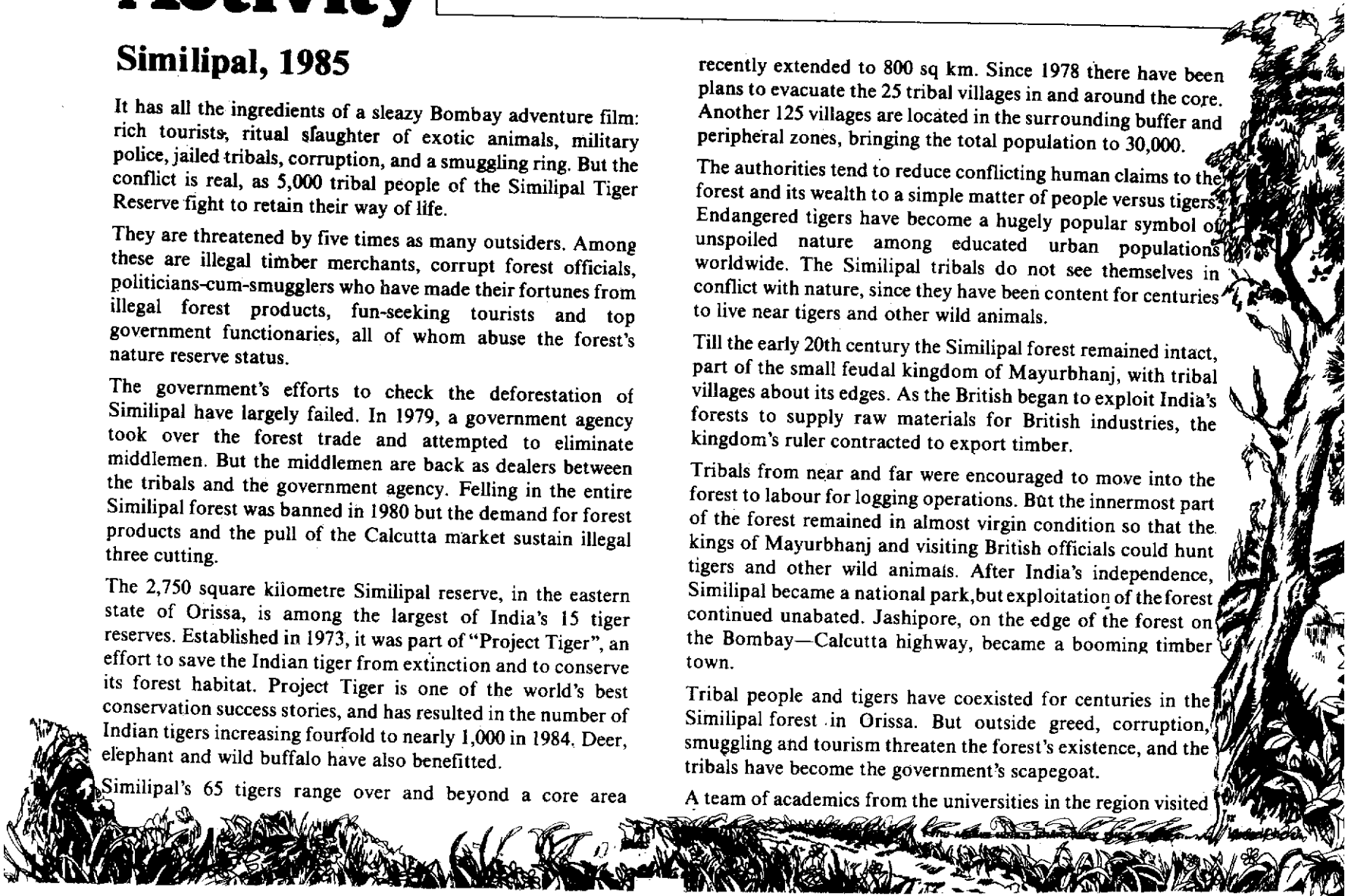
The authorities tend to reduce conflicting human claims to the forest and its wealth to a simple matter of people versus tigers. Endangered tigers have become a hugely popular symbol of unspoiled nature among educated urban populations worldwide. The Similipal tribals do not see themselves in conflict with nature, since they have been content for centuries to live near tigers and other wild animals.

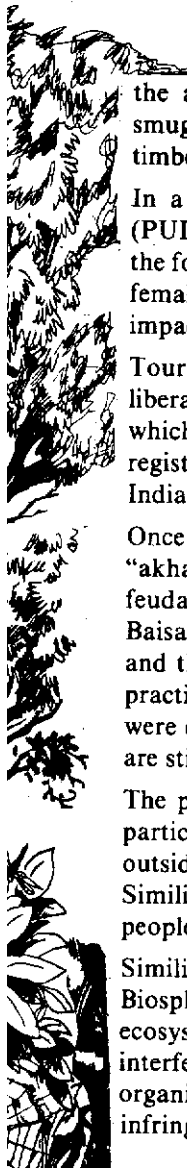
Till the early 20th century the Similipal forest remained intact, part of the small feudal kingdom of Mayurbhanj, with tribal villages about its edges. As the British began to exploit India's forests to supply raw materials for British industries, the kingdom's ruler contracted to export timber.

Tribals from near and far were encouraged to move into the forest to labour for logging operations. But the innermost part of the forest remained in almost virgin condition so that the kings of Mayurbhanj and visiting British officials could hunt tigers and other wild animals. After India's independence, Similipal became a national park, but exploitation of the forest continued unabated. Jashipore, on the edge of the forest on the Bombay—Calcutta highway, became a booming timber town.

Tribal people and tigers have coexisted for centuries in the Similipal forest in Orissa. But outside greed, corruption, smuggling and tourism threaten the forest's existence, and the tribals have become the government's scapegoat.

A team of academics from the universities in the region visited





the area recently. They found a well-established chain of smugglers and poachers and a flourishing illegal trade in timber and animal skins in the towns on the forest edge.

In a report to the People's Union for Democratic Rights (PUDR), the researchers said that the 15 rest houses within the forest have become pleasure haunts for the rich. Male and female prostitution is reported to be increasing, and the impact on the tribals is described as "devastating".

Tourists need permits to enter Similipal, but these are issued liberally. In 1984-85, 5,000 people got permits at Jashipore—which is just one of five entry points, into the forest. "The register at Jashipore reads like a 'Who's Who' of eastern India", says the report to the PUDR.

Once a year the reserve makes the news on the occasion of the "akhand shikar". This is a ritual mass hunt, originally led by feudal kings, which is observed every April on the festival of Baisakhi day. Each year there are clashes between the tribals and the police; as the government is determined to stop the practise. In 1985, five battalions of the Orissa Military Police were called in, and more than 100 persons were arrested and are still awaiting trial.

The people of Similipal forest themselves do not appear to participate in the hunt, which is carried out by tribals from outside the forest area. None of those jailed this year are from Similipal. But forest officials want to evacuate the local people regardless.

Similipal is to be upgraded to the status of a National Biosphere Reserve. But the choice is not between an ecosystem with no human interference and one with human interference, the academics point out, it is a choice between organised smuggling, poaching and occasional tribal infringements; between commercial tree clearance and small

fields cultivated by tribals; between the onslaught of 25,000 tourists and the subsistence of 5,000 tribals.

"It is a choice between two sets of human beings"—but also between the survival of the forest and its destruction.

— Sumi Krishna/Earthscan

1. Read the accompanying article, which appeared in newspapers in 1985, under the heading "Evicting Tribals for Fun and Profit". Give the article a headline of your own, and draw a sketch to illustrate some aspect of it.
2. There are many complex problems involved here: deforestation, saving the tiger, hunting for fun, hunting as ritual, the role of middlemen, poaching, smuggling, VIPs and tourism. Have a group discussion about these and any other problems you can list. Try and decide who can solve each of these problems—scientists, foresters, politicians, tribals, teachers, voluntary workers, tourists etc.
3. Can any one of the problems in your list be tackled by itself, without bothering about the others? Which one?
4. If you had to put the article into a lesson in a school text book, which subject would you fit it into—languages, science or social studies?
5. Look at the different choices posed in the last two paragraphs of the article. Then write down your thoughts briefly.

Help children to understand that environmental issues have many inter-linked facets which cannot easily be compartmentalised. If you go on a visit to a natural area, encourage children to look out for the social problems. (A possible answer to Q3 above is tourism, but this too is open to argument.)

## Last Days of the Dolphins

The solitary, slow-moving gangetic river dolphin is probably India's most neglected mammal. Unlike its gregarious, sea-living cousin, the common dolphin, it does not indulge in aerial acrobatics nor does it surf-ride on the bow wave of ships. In fact, most people don't even know it exists.

Yet, the river dolphin may be as vital to the Ganga as the tiger is to India's forests. Its reptilian companions of the river, the gharial and the turtle, are being actively conserved. India's gharial breeding programme is a widely acclaimed success story. But although the Gangetic dolphin is a protected species, there have been no major studies on the animal, and even basic information on its population and distribution on the river is scarce. However, in Nepal an alarming decline in the number of river dolphins in some of the tributaries of the Ganga has been reported.

River dolphins are something of a zoological curiosity. In the Indian subcontinent, they are found in the Indus, Ganga and Brahmaputra river systems. Like the other fresh water dolphins, the Amazonian river dolphin and the Chinese lake dolphin, they do not enter the sea.

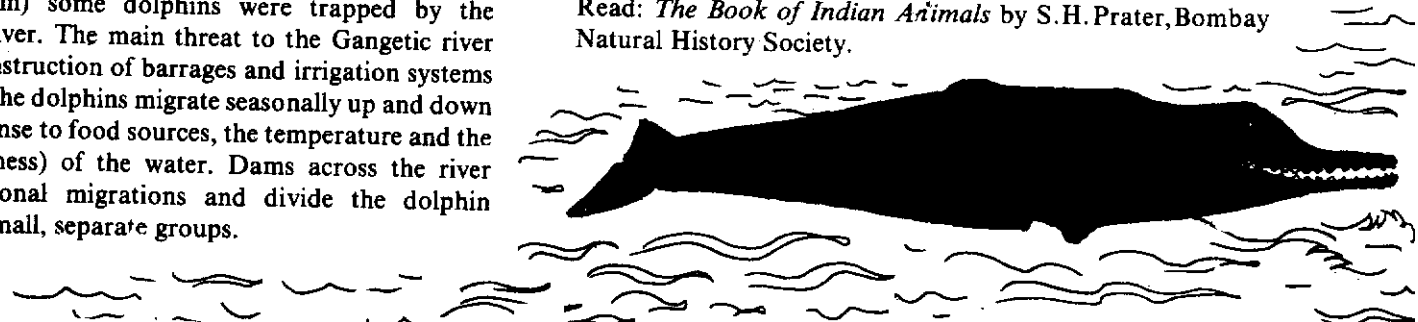
Both in the Amazon and in the Indian rivers, these fresh water mammals are threatened in many ways. For instance, in Kaziranga (Assam) some dolphins were trapped by the flooding of the river. The main threat to the Gangetic river dolphin is the construction of barrages and irrigation systems across the river. The dolphins migrate seasonally up and down the river, in response to food sources, the temperature and the turbidity (muddiness) of the water. Dams across the river block these seasonal migrations and divide the dolphin population into small, separate groups.

The second major threat is the pollution of its food sources—River dolphins feed on small crustaceans and fish. Industrial effluents (wastes) and the water from agricultural fields where pesticides and chemicals have been used contaminate the fresh water in a river. As a result harmful chemicals accumulate in the bodies of these small creatures, which are the dolphin's food. We do not, however, know exactly how this affects the river dolphin. The shy river dolphin is also disturbed by motor boats and ferries, and it is sometimes accidentally caught in fishing nets.

In the past, the river dolphin was a well-loved creature in India. In Hindu mythology it was one of the animals that came down with the Ganga itself, when the river descended from the heavens to the earth. It was protected by an Ashokan edict and often depicted in Mughal paintings. Fishing communities say that a dolphin always comes to the rescue of an injured dolphin on the river.

Make a group project about India's extinct, rare and threatened wild animals, reptiles, birds, or mammals. Choose one animal each, preferably a lesser known one, and find out about: its habitat and behaviour; the kinds of threats it faces; and if anything special is being done to protect it. Collect stories from legends and folk tales about the animal, to make your project more interesting.

Read: *The Book of Indian Animals* by S.H. Prater, Bombay Natural History Society.



## SUBJECT WISE KEY TO ACTIVITIES

### ACTIVITY NUMBERS

S.NO.	BOOK	LANGUAGE	ART & CRAFT	SCIENCE	HISTORY	CIVICS	GEO-GRAPHY	MATHS	GAMES & QUIZ	SPECIAL PROJECTS
1.	ONE EARTH	1,4,6,7, 9,10,11	2,9,12	5,7,8,10			1,3,4,5		8	10
2.	ECOLOGY	1,4,6,7 10,11,12	1,9,10 12	1,2,3,4, 5,6,7,8, 9,10,11			12	9	3,5,8,9	12
3.	LAND & WATER	1,3,7,11 12	1,7a	3,4,5,6, 7,7a	5	3	2,4,5,6 8,9,10,11		2,10	12
4.	TREES & FORESTS	1,12	2,3,10	3,4,5,8 10	4,12	6,7,9,10	6,7	5	11	
5.	LIVING RESOURCES	1,6,7,8, 9,11,12	1,3,4, 10,11	2,3,5,7 9,10,12		11			5	12
6.	HOUSES & CITIES	1,2,4,9 10,12	2,5,10	6,7,2	1,4,9,10	3,5,8 10,11,12	1,9	3,8	12	11
8.	ENERGY	1,2,3,11	1,8,9	3,4,5,6 10,11		2		4	4	11,12
9.	POLLUTION	1,2,3,5 6,8,10,11	2,5,7	5,6,8,9 10,11,12		3,5,6	4	9	8,12	